POSIX Threads and Synchronization

Data Types Related With POSIX Standard Threads

Data Types

- pthread_t
- pthread_attr_t
- pthread_mutex_t
- pthread_mutexattr_t
- pthread_cond_t
- pthread_condattr_t

Creation of POSIX Thread

Prototype

- int pthread_create(pthread_t *thread, const pthread_attr_t *attr, void *(*start_routine)(void *), void *arg);

Working With POSIX Threads

Prototypes

- int pthread_join(pthread_t thread, void **retval);
- int pthread_detach(pthread_t thread);
- pthread_t pthread_self(void);
- int pthread_equal(pthread_t t1, pthread_t t2);
- void pthread_exit(void *retval);

Mutex Initialization and Destruction

Macroses (Static Initialization)

- PTHREAD_MUTEX_INITIALIZER
- PTHREAD_ERRORCHECK_MUTEX_INITIALIZER
- PTHREAD_RECURSIVE_MUTEX_INITIALIZER

Prototypes

- int pthread_mutex_destroy(pthread_mutex_t *mutex);

Working With Mutexes (Locking and Unlocking)

Prototypes

- int pthread_mutex_lock(pthread_mutex_t *mutex); // maybe EDEADLOCK
- int pthread_mutex_trylock(pthread_mutex_t *mutex); // EBUSY
- int pthread_mutex_timedlock(pthread_mutex_t *mutex, const struct timespec *abstime); // ETIMEDOUT
- int pthread_mutex_unlock(pthread_mutex_t *mutex);

Cond (Condition) Initialization and Destruction

Macroses (Static Initialization)

- PTHREAD_COND_INITIALIZER

Prototypes

- int pthread_cond_init(pthread_cond_t *cond, const pthread_condattr_t *attr);
- int pthread_cond_destroy(pthread_cond_t *cond);

MUST BE LOCKED MUTEX

Working With Conds (Waiting and Signaling)

Prototypes

- int pthread_cond_wait(pthread_cond_t *cond, pthread_mutex_t *mutex);
- int pthread_cond_timedwait(pthread_cond_t *restrict cond, pthread_mutex_t * mutex, const struct timespec * abstime);
- int pthread_cond_signal(pthread_cond_t *cond);
- int pthread_cond_broadcast(pthread_cond_t *cond);